

C. Acceptance

The Department will accept the materials based upon their compliance with this specification.

D. Material Warranty

General Provisions 101 through 150.

Section 894—Fencing

894.1 General Description

This section includes the requirements for the following types of fence and fencing accessories:

- Chain link fence
- Woven wire fence
- Barbed wire
- Ground rods
- Field fencing
- Silt fabric fencing

894.1.01 Related References**A. Standard Specifications**

Section 862—Wood Posts and Bracing

Section 881—Fabrics

B. Referenced Documents

ASTM			AASHTO
A 116	A 392	A 817	M 181
A 121	A 491	A 824	
A 123/ A 123 M	A 584	F 626	
A 153/ A 153M	A 585	F 1043	
A 239	A 702	F 1083	

894.2 Materials**894.2.01 Chain Link Fence****A. Requirements**

Ensure that zinc or aluminum coated steel fabric, fittings, accessories, and posts for chain link fence meet the following requirements.

1. Fence Fabric

Use woven wire with reasonably uniform 2 in (50 mm) square mesh. Ensure that the mesh has parallel sides and horizontal and vertical diagonals of uniform dimensions. Use the wire size specified on the Plans or in the Proposal.

- a. Zinc Coated: Use steel fabric that meets the requirements of ASTM A 392. Ensure that the wire and hot-dip coating meet the requirements of ASTM A 817 Type II, Class 1.
- b. Aluminum Coated: Use steel fabric that meets the requirements of ASTM A 491. Ensure the wire and coating meets the requirements of ASTM A 817, Type I.

2. Fittings and Accessories

- a. Tension Wire: Use wire that meets the requirements of ASTM A 824 Type I for aluminum coated fabric, or Type II, Class 2 for hot-dipped, zinc-coated fabric.

- b. Fittings: Use fittings that meet the requirements of ASTM F 626.
 - 1) Ensure fittings or accessories not included in ASTM F 626 meet industry standards for heavy, industrial-type fences.
 - 2) Hot-dip the materials in zinc with at least 1.2 oz./ft² (365 g/m²) of surface area. If applicable, you may make the materials from Aluminum Alloy 360, die-cast, or Sand Alloy 356, ZG61A, or Tenzalloy.
 - 3) Use bolts and nuts that meet industry standards and are zinc coated with the hot-dip process according to ASTM A 153/A 153 M.
- 3. Posts, Rails, and Braces

Use posts, rails, and braces that meet the requirements of ASTM F 1043, Table 2, Group IA, IC, II, or III..

 - a. Group IA, II, and III posts to be used with zinc coated or aluminum coated chain link fence shall meet the coating requirements of ASTM F 1083.
 - b. Group IC posts to be used with zinc coated or aluminum coated chain link fence shall be coated according to AASHTO M 181 Section 32.3.
 - c. Check the Plans for specifications on posts used for special applications. Use special posts that meet the requirements of ASTM F 1083 or are approved by the Office of Materials and Research.
- 4. Gates

Use support posts and gate frames as designated on the Construction Detail or Project Plans. Use gate materials that meet the requirements of Subsection 894.2.01.A.3.

 - a. Use the same coating requirements as for the fence posts. Coat gate frames after completing all welding.
 - b. Use fittings and hinges that meet the requirements of Subsection 894.2.01.A.2.b.

B. Fabrication

Ensure that the chain link fence fabric is produced by recognized, good commercial practices.

- 1. Apply the zinc or aluminum coating to the fabric in a continuous process. Do not apply in roll form.
- 2. Carefully inspect the coated fabric visually, both before and after weaving, to determine the coating quality.

C. Acceptance

The Department will reject chain link fabric that has excessive roughness, blisters, sal ammoniac spots, bruises, flaking, bare spots, or other obvious defects to any considerable extent.

D. Materials Warranty

General Provisions 101 through 150.

894.2.02 Woven Wire Fence

A. Requirements

- 1. Fabric

Use fabric that meets the requirements of ASTM A 116, Design Number 1047-6-11, with Class 3 coating.

 - a. Ensure that the galvanizing is uniform.
 - b. Ensure that less than 5 percent of the joints are deficient in zinc coating, as determined by ASTM A 239.
 - c. You may use aluminum coated steel that meets the requirements of ASTM A 584, Design Number 1047-6-11, for the woven wire fence fabric.
- 2. Posts

Use steel or wood posts of the sizes shown on the Plans.

 - a. Use wood posts that meet the requirements of Subsection 862.2.01.
 - b. Use steel posts and bracing that meet the requirements of ASTM A 702. Galvanize posts and braces with the hot-dip method according to ASTM A 123/A 123M.
- 3. Certification

Furnish a certification to the Engineer from the manufacturer that shows the physical properties of the materials.
- 4. Accessories

Galvanize the following accessories according to ASTM A 153/ A 153M. Use 0.80 oz./ft² (245 g/m²) as the galvanizing minimum. Galvanize other accessories as necessary or specified on the Plans.

 - a. Wire Fasteners: Use fasteners that meet the requirements of ASTM A 702.

- b. Tension Wire: Use No. 11 gauge wire.
 - c. Staples: Use No. 9 gauge staples 1-1/2 in (38 mm) long.
 - d. Nails: Use 1 in (25 mm) roofing nails to fasten metal caps to wooden posts.
5. Gates
- Use support posts and gate frames of the size designated on the Construction Detail or Project Plans.
- a. Use a frame that is an all welded unit. Ensure that the gate is galvanized after welding with 2 oz./ft² (610 g/m²) of spelter coating.
 - b. Use hinges, latches, and other accessories of good commercial quality that are coated as in Subsection 894.2.02.A.4.

B. Fabrication

- 1. Ensure that the woven wire fence fabric is produced by methods recognized as good commercial practices.
- 2. Carefully inspect the galvanized fabric to determine the zinc coating quality.

C. Acceptance

The Department will reject woven wire fabric that has excessive roughness, blisters, sal ammoniac spots, bruises, flaking, bare spots, or other obvious defects to any considerable extent.

D. Materials Warranty

General Provisions 101 through 150.

894.2.03 Barbed Wire

A. Requirements

- 1. Galvanized Steel Barbed Wire
Use wire that meets the requirements of ASTM A 121 and has a Class 3 zinc coating.
- 2. Aluminum Coated Steel Barbed Wire
Use wire that meets the requirements of ASTM A 585.
- 3. Posts
Use posts as specified in Subsection 894.2.02.A.2 for barbed wire fence.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

894.2.04 Ground Rods

A. Requirements

- 1. Use ground rods that are 9/16 to 5/8 in (14 to 16 mm) diameter and at least 8 ft (2.4 m) long, unless otherwise shown on the Plans.
- 2. Ensure that the ground rods are galvanized steel with a minimum coating of 2 oz./ft² (610 g/m²) according to the requirements of ASTM A 153/ A 153M.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

894.2.05 Field Fencing (Woven Wire and Barbed Wire)**A. Requirements**

1. Definition
Field fencing designates replacement fencing outside the Right of Way or temporary fencing inside the Right of Way, provided you do not reuse the materials for permanent fencing inside the Right of Way.
2. Fence fabric
Use woven wire fabric that meets the requirements of ASTM A 116 Design No. 939-6-12-1/2, and has a Class I coating, unless otherwise designated.
3. Barbed wire
Use wire that meets the requirements of ASTM A 121 and has a Class I coating. Use the same number of barbed wire strands as the existing or replaced fence, or as specified in the Plans.
4. Posts
Use either galvanized steel, painted steel, or treated timber of the dimensions and spacing shown on the Construction Detail or Plans.
5. Gates
Use posts, frame material, hinges, and fittings of acceptable commercial quality. Get approval from the Engineer before use.
6. Use the Special Plan Details and/or Special Provisions for any special design of the field fence.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

1. Get approval from the Engineer for all materials. Ensure that the materials are of an acceptable commercial quality and are equivalent in quality to the fence being replaced or to the existing fence, as applicable.
2. Do not send materials to the laboratory unless requested by the Engineer or required by the Plans.

D. Materials Warranty

General Provisions 101 through 150.

894.2.06 Silt Fabric Fencing**A. Requirements**

1. Fabric
 - a. See Subsection 881.2.07, "Silt Fence Filter Fabric," for the types of fabric available.
 - b. Use a woven wire support fence with Type "C" fence.
 - 1) Ensure that the wire fence fabric is at least 32 in (810 mm) high with at least 6 horizontal wires.
 - 2) Ensure that the vertical wires have a maximum spacing of 12 in (155 mm).
 - 3) Ensure that the top and bottom wires are at least 10 gauge (2.49 mm) and all other wires are at least 12-1/2 gauge (2.03 mm).
 - 4) You may use other designs subject to approval by the Office of Materials and Research.
2. Posts
Use post sizes and types as determined by the type of fence being installed. Generally hardwood posts will be limited to ash, hickory, or oak. Other hardwoods may be acceptable if approved by the Office of Materials and Research.
 - a. Type "A" Fence: Use either wood or steel posts that are at least 4 ft (1.2 m) long.
 - 1) If using soft wood, use posts that are at least 3 in (75 mm) in diameter or nominal 2 x 4 in (33 x 89 mm) and straight enough to provide a fence without noticeable misalignment.
 - 2) If using hardwood, use posts that are 1-1/2 x 1-1/2 in (38 x 38 mm) with a minus tolerance of 1/4 in (6 mm) providing the cross sectional area is at least 2.25 in² (1440 mm²).
 - 3) If using steel, use posts that are "U," "T," or "C" shaped with a minimum weight of 1.15 lb/ft (1.7 kg/m), and have projections for fastening the fence to the posts.

- b. Type “B” Fence: Use either wood or steel posts that are at least 3 ft (900 mm) long.
 - 1) If using soft wood, use posts that are at least 2 in (50 mm) in diameter or nominal 2 x 2 in (33 x 33 mm).
 - 2) If using hardwood, use posts that are 1 x 1 in (25 x 25 mm) with a minus tolerance of 1/4 in (6 mm) providing the cross sectional area is a minimum of 1 in² (625 mm²).
 - 3) If using steel posts, use types “U,” “T,” or “C” shapes with a minimum weight of 0.75 lb/ft (1.1 kg/m).
- c. Type “C” Fence: Use only steel posts that are at least 5 ft (1.5 m). Use “U,” “T,” or “C” shaped posts with a minimum weight of 1.15 lb/ft (1.7 kg/m). Use posts that have projections for fastening the woven wire and filter fabric.

NOTE: You must use woven wire to provide extra support for Type “C” fence installations.

3. Fasteners for Wooden Posts

- a. Wire Staples: Use staples that are at least 17 gauge (1.37 mm), legs at least 1/2 in (13 mm) long, and a crown at least 3/4 in (19 mm) wide.
- b. Nails: Use nails that are at least 14 gauge (2.03 mm), 1 in (25 mm) long, with button heads of at least 3/4 in (19 mm).

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

Section 910—Sign Fabrication

910.1 General Description

This section includes the requirements for fabricating and applying messages on sign blanks, laminated panels, and extruded panels.

910.1.01 Related References

A. Standard Specifications

Section 107—Legal Regulations and Responsibility to the Public

Section 911—Sign Posts

Section 912—Sign Blanks and Panels

Section 913—Reflectorizing Materials

Section 914—Sign Paint

Section 915—Mast Arm Assemblies

Section 917—Reflective and Nonreflective Characters

B. Referenced Documents

Manual on Uniform Traffic Control Devices (MUTCD)

910.2 Materials

Use the dimensions, colors, and reflectorizing as specified in the Plans, Proposal, and Manual on Uniform Traffic Control Devices (MUTCD).